

CLAIMS

1. A hexagonal lithium-cobalt composite oxide for a lithium secondary cell, which is represented by the formula $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$, wherein x is $0 \leq x \leq 0.02$ and M is at least one member selected from the group consisting of Ta, Ti, Nb, Zr and Hf, and which has a half-width of the diffraction peak for (110) face at $2\theta = 66.5 \pm 1^\circ$, of from 0.070 to 0.180° , as measured by the X-ray diffraction using CuK_α as a ray source.
2. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, wherein x is $0.0005 \leq x \leq 0.02$, and the half-width of the diffraction peak for (110) face is from 0.100 to 0.165° .
3. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, wherein x is 0, and the half-width of the diffraction peak for (110) face is from 0.080 to 0.100° .
4. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, 2 or 3, wherein the packing press density of the hexagonal lithium-cobalt composite oxide is from 2.90 to 3.35 g/cm^3 .
5. A process for producing the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, which comprises dry blending a cobalt oxyhydroxide powder having an average particle size of from 1 to $20 \text{ }\mu\text{m}$ and a specific surface area of from 2 to $200 \text{ m}^2/\text{g}$, a lithium carbonate powder having an

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average particle size of from 1 to 50 μm and a specific surface area of from 0.1 to 10 m^2/g , and a powder of an oxide of metal element M having an average particle size of at most 10 μm and a specific surface area of from 1 to 5 100 m^2/g , and firing the mixture at a temperature of from 850 to 1,000°C in an oxygen-containing atmosphere.

6. The process for producing the hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 5, wherein the mixture is fired for 10 from 4 to 30 hours.

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7. A positive electrode for a lithium secondary cell, which contains the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, as an active material.

15 8. The positive electrode for a lithium secondary cell according to Claim 7, having a mixture comprising the active material, an electrically conductive material and a binder, supported on a current collector.

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20 9. The positive electrode for a lithium secondary cell according to Claim 7 or 8, wherein the current collector is aluminum or stainless steel.

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25 10. A lithium secondary cell employing a positive electrode which contains the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, as an active material.

11. The lithium secondary cell according to Claim 10, wherein a cyclic or chain carbonic ester is used as a

solvent for the electrolyte.

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